Letters to the Editor

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EFFECT OF CHEMICAL TREATMENT ON THE STRUCTURE AND PROPERTIES OF GRAPHITE

S. RAY

Department of Magnetism Indian Association for the Cultivation of Science, Calcutta 32

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Plate VI

In view of the looseness of binding between the different layers of the crystals of graphite, the usual practice (Primak and Fuchs, 1954 , Soule, 1958) of purifying the natural crystals of graphite by treating them with hydrofluoric and hydrochloric acids and drying them by heating before measuring their electrical properties may naturally be expected to cause a certain amount of disturbance in the structure and possibly in the electrical resistivities along the hexagonal axis also (as in the case of magnetic properties of graphite after treatment with H_2SO_4, HNO_3, $KClO_3$; Ganguly, 1936). Such purificatory treatments may therefore be objectionable from the point of view of studying the properties of single crystals of graphite. We, in consequence, undertook to detect the presence, if any, of such structural changes by means of X-rays.

Rotation photographs about a binary axis of naturally occurring crystals of graphite were taken using filtered copper radiation. The crystals were then treated with strong hydrofluoric acid, washed with water, then treated with strong hydrochloric acid, again washed in running water for a long time, and finally dried in a vacuum oven. Rotation photographs were then taken again as before. (Figures 1(a) & (b) (Plate VI) show the effect of these treatments on a particular crystal of graphite. In the case of untreated crystal it is seen that the spots corresponding to the reflections from the basal planes (0002 and 0004) appear, as is usual with naturally occurring graphite, a little drawn out, due evidently to the presence of a small amount of randomness in the arrangement of the crystal

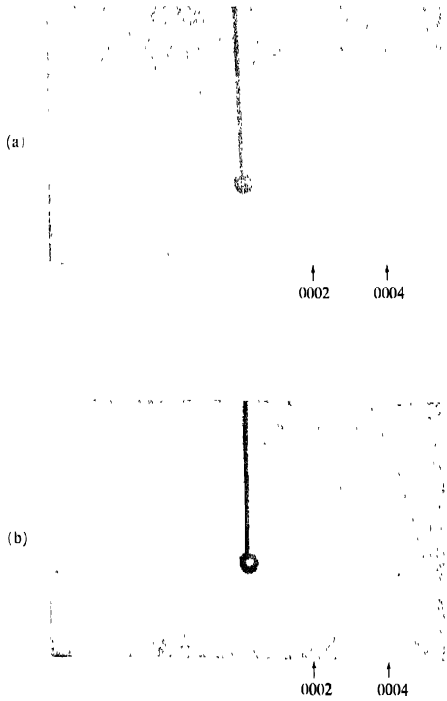

Fig. 1.—Rotation photographs about *a*-axis of a natural crystal of graphite (a) Before chemical treatment. (b) After chemical treatment. (The superposed Debye-Scherrer pattern is due to aluminium powder sprinkled on the crystal).